

Reply to the Office Action of June 14, 2005
Response Dated September 14, 2005

Attorney Docket No.: CSCO-006/2879
Appl. No.: 09/910,936

Amendments to the Specification

Please replace the paragraph beginning at page 2 line 2, with the following rewritten paragraph:

5 –The present application is related to the co-pending US Patent Application entitled, “Network Address Translation in a Gateway”, Attorney docket number: CSCO-005/2899, ~~Serial Number~~ Application number: UNASSIGNED09/910937, Filing Date: UNASSIGNED07/24/2001, assigned to the common assignee (“Cisco Technology, Inc.”), and is incorporated in its entirety herewith. –

10 Please replace the paragraph beginning at page 3 line 12, with the following rewritten paragraph:

 –Such substitutions also require a lookup operation, in which a NAT table is examined to map the original address to the new address. For further details of many types of NAT implementations, the reader is referred to request for comment (RFC) 1661,
15 ~~available from www.ietf.org, and is incorporated in its entirety herewith. –~~

Please replace the paragraph beginning at page 4 line 5, with the following rewritten paragraph:

20 –In one embodiment, the gateway device comprises a service selection gateway connecting multiple remote systems to multiple service domains. The service domains may provide external addresses which are bound (mapped) to/from respective local addresses of remote systems. The NAT information specifies the respective bindings. A multi-way content addressable memory (CAM) indexed by source and destination addresses may be used to store the NAT and forwarding related information. –

25 Please replace the paragraph beginning at page 5 line 13, with the following rewritten paragraph:

30 –A gateway device implemented in accordance in with the present invention determines forwarding information (i.e., port to be forwarded on) and NAT mapping information (new address corresponding to a original address) using a single search operation. In one embodiment described below, a single memory (e.g., content ~~accessible~~ addressable memory) stores both pieces of information necessary to process a packet in

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the form of single table, and only a single memory access is required to determine both pieces of information. Due to such retrieval in a single search and/or memory access, the performance throughput of a gateway may be improved. –

5 Please replace the paragraph beginning at page 6 line 13, with the following rewritten paragraph:

 –Each of the remote systems 110-A through 110-X is addressed by a local address, unique at least when SSG 150 assigns the local addresses during the set up of the corresponding PPP (point-to-point protocol) sessions. Only the details of PPP as relevant
10 to an understanding of the example environment are described herein. For further details about PPP, the reader is referred to request for comment (RFC) 1661, ~~available from~~
~~www.ietf.org, and is incorporated in its entirety herewith.~~ Computer systems (or any data processing systems) are examples of the remote systems. –

15 Please replace the paragraph beginning at page 7 line 9, with the following rewritten paragraph:

 –For illustration, it is assumed that a user wishes to access service domain 160 using remote system 110-A (having a local IP address of addr-A). Using a known approach, service domain 160 may assign an IP address of addr-T to remote system ~~110~~
20 110-A for accessing service domain 160. Addr-T represents a unique address at least in service domain 160. Similarly, using another known approach (e.g., during PPP session set up or even manually by a network administrator), remote system ~~110~~ 110-A is assigned a local address of addr-A. –

25 Please replace the paragraph beginning at page 10 line 8, with the following rewritten paragraph:

 –Inbound interface 310 is shown receiving packets from three paths (125, 156 and 157 of Figure 1). Inbound interface 310 assembles each packet and forwards the packets to service selector block 320. Inbound interface 310 provides the electrical and other
30 protocol interfaces necessary to receive packets from various paths, and may be implemented in a known way. Outbound interface 390 is also described similarly, except that the packets received from per-service blocks 340-A (forwarding and NAT block 350

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reformatter389) and 340-B are transmitted in the outbound direction on the same three ports. –

5 Please replace the paragraph beginning at page 11 line 5, with the following rewritten paragraph:

Service selector 320 then selects one of the per-service blocks 340-A or 340-B (or more specifically the corresponding NAT table) depending on the determined service domain. Assuming the determined service domain is service domain 160 and per-service block 340-A is designed to process the packets related to service domain 340-A 160,
10 service selector 320 passes a received packet to per-service block 340-A.

Please replace the paragraph beginning at page 13 line 3, with the following rewritten paragraph:

Once the NAT information and the forwarding information is received, NAT
15 ~~lookup~~– forwarding and NAT block 350 replaces the old address with the determined new address, and forwards the packet according to the forwarding information retrieved from forwarding and NAT table 355. The throughput performance of SSG 150 may be enhanced due to the availability of NAT and forwarding information in a single memory access.

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Please replace the paragraph beginning at page 14 line 5, with the following rewritten paragraph:

Memory block 420 and/or storage 430 may be referred to as a memory. Memory block 420 may receive instructions and data on path 450 from storage 430. Even though
25 shown as one unit, memory block 420 may be implemented as several units. One of the units may correspond to a CAM storing the forwarding and NAT tables managed in accordance with the present invention. As noted above, such storage enables the NAT and forwarding information in a single memory access. ~~Secondary memory~~ Storage 430 may contain units such as hard drive 435 and removable storage drive 437. ~~Secondary storage~~ Storage 430 may store the software instructions and data, which enable SSG 150
30 to provide several features in accordance with the present invention.